IN THE CLAIMS

Please amend the claims as follows:

Claims 1-10 (Canceled).

Claim 11 (New): A method for real-time determination of the mass of particles present in a particle filter installed in an exhaust line of an internal combustion engine, comprising the following sequence of operations repeated at determined time intervals Δt:

(i) at an instant t, measuring the temperature $T(t)$ of the exhaust gases at the inlet of the particle filter using a temperature sensor;

(ii) at the instant t, measuring operating parameters of the engine by sensors;

(iii) at the instant t, reading, from pre-established tables, as a function of the operating parameters of the engine, values of the following parameters: oxygen concentration $[O_2(t)]$ and nitrogen oxides concentration $[NO_x(t)]$ of the exhaust gases entering the particle filter, and the rate F(t) of emission of particles from the engine;

(iv) at the instant t, using the kinetic laws of chemical reactions of combustion of particles, calculating the rate $V(t)$ of combustion of the particles in the particle filter by the following parameters: temperature $T(t)$, concentrations $[O_2(t)]$, $[NO_x(t)]$ of oxidizing agents, and mass $m_c(t - \Delta t)$ of particles present in the filter, obtained during the reading (iii) preceding cycle of at the instant $t - \Delta t$;

(v) at the instant t, calculating the mass $m_c(t)$ of particles present on the filter, using the mass $m_c(t - \Delta t)$ of particles obtained during the preceding cycle of operations according to the following formula:

$$m_c(t) = m_c(t - \Delta t) + [F(t) - V(t)] * \Delta t,$$

where Δt is the time interval between the instants $t - \Delta t$ and t,

(vi) reading the value calculated at the instant t for the mass $m_c(t)$ of particles present on the filter so that it can be used in the following sequence of operations at the instant $t + \Delta t$.

Claim 12 (New): A method according to claim 11, wherein one or more values of the parameters $[O_2(t)]$, $[NO_x(t)]$, $F(t)$ is obtained by measurement with sensors instead of by reading from pre-established tables.

Claim 13 (New): A method according to claim 11, wherein for calculation of the rate $V(t)$ of combustion, reactions of combustion of the particles by the nitrogen oxides NO_x and oxygen O_2 are considered, the rate of combustion being the sum of the rates of the reactions of combustion of the particles by the nitrogen oxides (V_{NO_x}) and oxygen (V_{O_2}):

$$V(t) = V_{NO_x} + V_{O_2},$$

where:

$$V_{NO_x} = K_1 e^{-Ea1/RT(t)} \times [m_c(t - \Delta t)]^{a1} \times [NO_x(t)]^b$$

$$V_{O_2} = K_3 e^{-Ea3/RT(t)} \times [m_c(t - \Delta t)]^{a3} \times [O_2(t)]^d$$

where $T(t)$, $[O_2(t)]$, $[NO_x(t)]$ are determined during the preceding operation (iii), $a1$, $a3$, b and d are partial orders of the combustion reactions, and $Ea1$ and $Ea3$ are activation energies of the reactions of combustion by the nitrogen oxides and oxygen respectively.

Claim 14 (New): A method according to claim 13, in which the particle filter contains an active phase for catalyzing combustion of the particles, wherein during calculating the rate of combustion, there is additionally considered the reaction of combustion

of the particles by the oxygen present in the active phase of the particle filter, the rate of combustion being the sum of the rates of the reactions of combustion of the particles by the nitrogen oxides (V_{NO_x}), by oxygen (V_{O_2}) and by the oxygen of the active phase ($V_{O_{2catalyst}}$):

$$V(t) = V_{NO_x} + V_{O_2} + V_{O_{2catalyst}}$$

where $V_{O_{2catalyst}} = K_2 e^{-Ea2/RT(t)} \times [m_c(t - \Delta t)]^{a2} \times [O_{2catalyst}(t)]^c$

where $[O_{2catalyst}(t)]$ is the concentration of oxygen in the active phase of the filter at the instant t, read from a table pre-established during a preceding operation as a function of the operating parameters (Ne, Q) of the engine, $a2$ and c are partial orders, and $Ea2$ is the activation energy of the reaction of combustion by the oxygen of the active phase.

Claim 15 (New): A method according to claim 11, wherein at the initial instant t_i, the mass $m_c(t - \Delta t)$ of particles present in the filter and used in operations (iv) and (v) is replaced by a mass ($m_{pressure}(t_i)$) of particles present in the filter, estimated by measuring the head loss between the inlet and outlet of the filter at the instant t_i.

Claim 16 (New): A method according to claim 15, wherein the mass ($m_{pressure}$) of particles present in the filter, estimated from a measurement of the head loss between the inlet and outlet of the filter, is used in the operations (iv) and (v) at an instant t different from the initial instant.

Claim 17 (New): A method according to claim 11, wherein the measurement of the operating parameters of the engine comprises:

sensing the speed Ne of revolution of the engine, by using a speed sensor; and

sensing the engine load Q, by using a load sensor.

Claim 18 (New): The use of the determination method according to claim 11 to monitor and/or control a method for management of the regeneration of a particle filter of a motor vehicle.

Claim 19 (New): The use according to claim 18, in which the determination method is used when the temperature at the inlet of the filter is between approximately 250°C and 500°C.

Claim 20 (New): The use of the determination method according to claim 11 in a method for management of the regeneration of a particle filter of a motor vehicle, to determine, for each operating point of the engine of a vehicle, a threshold mass of particles, below which the filter will tend to become loaded with particles and above which the rate of combustion of the particles in the filter will tend to increase.